Last Name:_____ First Name:_____
Immatriculation No.:_____ Place No.:_____

BERGISCHE UNIVERSITÄT WUPPERTAL
Fachbereich Wirtschaftswissenschaft

Klausuraufgaben

International Environmental Economics and International Policy Issues

Alle Studienrichtungen

Prüfer / Examiner:
Prof. Dr. P.J.J. Welfens

Prüfungstag / Date:
22.08.2017

Erlaubte Hilfsmittel / Allowed tools:
Taschenrechner (Nicht-programmierbar) / Calculator (Non-programable)

Alle Aussagen sind zu begründen und Rechenschritte, so fern notwendig vollständig wiederzugeben.
Abweichungen führen zu Abzügen bei der Punktzahl.
Bei Unklarheiten im Verständnis der Aufgaben ist anzugeben unter welchen Annahmen die Aufgaben bearbeitet wurden.
Die Klausur gilt als bestanden, wenn die erreichte Punktzahl mindestens 45 Punkte beträgt.
Nutzen Sie die vierte Seite des Aufgabenhefts als Konzeptpapier.

All arguments are to be justified and all steps of any calculation should be stated.
Deviations may lead to a deduction of points.
If unclear on how to answer a question, name the assumptions under which the question has been answered.
The exam is passed if the overall amount of points is at least 45.
Please use the last page of the exercises for notes.

_____
Unterschrift / Signature

Die Klausur besteht aus insgesamt 9 Seiten. / The exam consists of 9 pages.

Part I - Udalov

Question 1 (12 Points)

a) Using the Kaya identity, express the total emission level of the carbon dioxide as the product of four factors. (3)

b) Explain briefly why a decrease in energy intensity does not necessarily mean an increase in energy efficiency. (3)

c) Show graphically the Environmental Kuznets Curve and name four possible reasons that explain its shape. (3)

d) Name the properties of a public good. Explain shortly why governmental intervention is required for the provision of a public good. (3)

Question 2 (18 Points)

A cement producing company has the following marginal private costs:

$$MPC(x) = 5 + 3x,$$

whereby *x* corresponds to the produced amount of cement.

Cement production causes environmental damages of which the associated costs are not borne by the producer or consumer of that electricity. These damages are represented by the following marginal external costs:

$$MEC(x) = 2x$$

The demand function for cement is equal to

$$MPB(x) = 40 - 2x$$

a) Calculate the uncorrected cement market equilibrium. (2)

b) Calculate the marginal social cost *(MSC)* and marginal abatement cost *(MAC)*. (2)

c) Calculate the output of the cement producer in the social equilibrium. (2)

d) Determine the level of the Pigou tax which is required to internalize the negative externality. Calculate the corresponding tax revenue. (2)

e) Show graphically the market for cement. Please draw *MPC(x)*, *MSC(x)*, *MEC(x)*, *MPB(x)* and *MPC(x)+Pigou Tax*. (3)

f) Calculate the aggregated welfare before and after imposing the Pigou tax. How big is the welfare gain? (7)

Part II - Baier

1. **Non-renewable resource extraction** (11)
   A known, finite oil stock will be exploited over a finite period of time (t = 50 years). Utility comes directly from consuming the resource R in each period, no negative external extraction effects are considered, though extraction involves cost C.

   a) Distinguish between gross- and net benefit of the resource (in words or mathematically). (2)

   b) It can be decided to extract rather high quantities in the early phase and therefore less later on, or vice versa. What role does the interest rate play? What role does the shadow price of the resource play? (2)

   c) Given a resource net price P which increases as the stock decreases (scarcity), choke price K and a decreasing demand function with increasing net price, show graphically and explain the effect on price and depletion horizon when the oil field turns out to be bigger than initially expected (resource stock is increased). (5)

d) Would a monopolist set the net price higher or lower than the competitive market price? What effect would this have on the depletion horizon? (2)

_____
_____
_____
_____

2. **Present value maximizing fishery** (10)

a) Shortly explain how property rights can lead to a more profitable outcome than in open access. What role does trust play in that? (2)

_____
_____
_____
_____

b) The fishermen have the option to delay harvesting for stock growth. This has however effects on growth level and harvesting cost; interpret the steady state equation below and show how a rising interest rate i leads to a new steady state equilibrium. (2)

$$ip = p\frac{\mathrm{d}G(S)}{\mathrm{d}S} - \frac{\partial C(H,S)}{\partial S}$$

_____
_____
_____
_____

c) Show graphically how a steady state would shift if it is assumed that harvesting cost does not depend on stock size any more, solely on growth rate of the stock and interest rate. (3)

d) Comparing static private property, present-value maximizing and open-access fishery, explain why an arbitrary large interest rate leads PV models to a collapse into the open-access case without regulation and zero market gains. (3)

3. **Backstop Technology** (5)
   How is choke price K linked to backstop technologies? Discuss a short example and show (graphically or in words) the role of switching costs.

4. **EU fish discarding law** (4)
   How do EU discard laws impact fishing behavior? Is there a price effect? If yes, how does it look like? Discuss.

Part III – Guest speeches

Question 1 - Wilts (15 Points)

How does information availability affect price development processes on markets for recycled materials?

Question 2 - Erdem (15 Points)
Explain the basics of the incentive regulation of networks in Germany.